NASAfacts

# NASA Aeronautics Research Institute

Through aeronautical collaborative research agreements and the application of virtual meeting collaborative tools, the NASA Aeronautics Research Institute (NARI) promotes innovation in aeronautics across a broad spectrum of aeronautical challenges in the nation's air transportation system. The Institute facilitates and coordinates collaborations across those efforts, and communicates the outcome of the research conducted to interested parties both internal and external to NASA.

NARI, part of NASA's Aeronautics Research Mission Directorate (ARMD), fosters deliberate investments in innovative, early-stage, and potentially revolutionary aviation concepts and technologies. ARMD sees enormous benefits from stimulating innovative research and technology development in aeronautics that will be essential to America's economic competitiveness and the protection of America's security interests. The Institute provides ARMD another avenue to introduce fresh lines of research into existing ARMD programs and projects. As a result, NARI complements other ARMD efforts in seeking early-stage innovative concepts. NARI is funded through the ARMD Transformative Aeronautics Concepts (TAC) Program.

**OBJECTIVES**

The objectives of NARI are to advance the field of aeronautics by:

- Establishing a highly effective conduit for collaboration between NASA, industry, and academia to develop aeronautics and to promote aeronautics innovation;
- Identifying emerging or rapidly changing technology opportunities for applicability to aeronautics, and fostering collaboration between entities pursuing those opportunities;
- Partnering strategically to foster and accelerate research of interest to aeronautics;
- Implementing new mechanisms to elicit innovation in aeronautics;

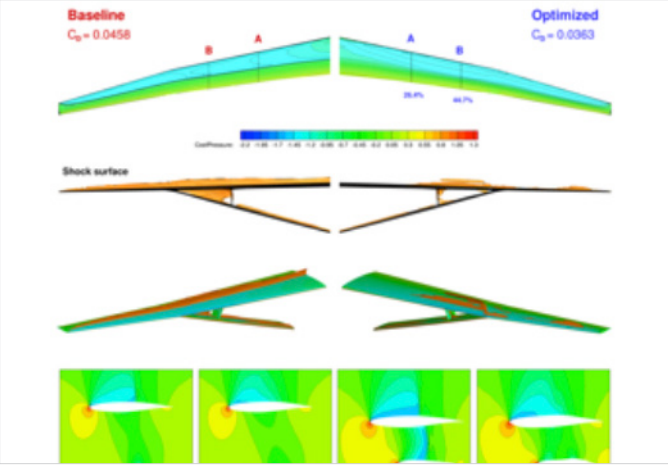
A NARI-funded research effort: The Leading Edge Asynchronous Propeller Technology large-scale powered model is investigating how Distributed Electric Propulsion enables new vehicle capabilities through tight coupling of propulsion to the entire vehicle system.

- Exploring new concepts with the potential to mature into commercially relevant capabilities; and
- Supporting education and public outreach by
  - Disseminating the results of ARMD research to the widest practical and appropriate extent (consistent with national security and foreign policy).
  - Helping develop and disseminate systems-level, inter-disciplinary aeronautics education.

**APPROACH**

NARI is a "virtual institute" that engages multi-institutional, multi-disciplinary research teams to address a broad range of major aeronautics research questions. ARMD provides policy guidance for the Institute, including review and approval of implementation plans; review and concurrence for interagency agreements; and compliance with agency requirements. NASA's Ames Research Center serves as the host for the Institute, providing staff and infrastructure. NARI shares the virtual collaboration infrastructure with two existing NASA virtual institutes at Ames but tailors these resources to the needs of the aeronautics research community. The Institute ensures the dissemination of NARI-related aeronautical research findings via the Internet and through web-based seminars.

NARI is also tightly integrated with the Leading Edge Aeronautics Research for NASA (LEARN) Project and supports the execution of their Collaborative Research Agreements. The LEARN Project is an element of the ARMD TAC Program and annually invests in innovative ideas from outside NASA. It provides domestic innovators the opportunity to perform research, analysis, and proof-of-concept development of their novel ideas that have the potential to meet national aeronautics needs. Agreements are funded in one or two phases that are competitively selected based on a peer review by subject matter experts.




A NARI-funded research effort: This Multi-Discipline Design Optimization suite of tools is striving to simultaneous integrate mission and design objectives. In this truss-braced wing example, drag is shown to be reduced by 58% relative to a non-optimized design.

NARI engages and supports students through the Ames Aeronautics Academy, postdoc fellowships, summer internships, and the student members of Collaborative Research Agreement teams. The Institute also provides infrastructure and technical support for student virtual technical symposiums, including the International Forum for Aviation Research.

**BUDGET**

The ARMD TAC Program Fiscal Year 2015 budget includes a $5 million allocation for NARI operations, prize challenges and special projects, and $5 million for Collaborative Research Agreement awards. Prize money for competitions can come from the TAC Program, other NASA programs, or non-NASA outside sources. NASA does not require, but will accept, resources offered by collaborative research partners.

## We're Working on...

Developing early-stage processes, concepts or technologies that have the potential to meet national aeronautics needs

Maturing research that is not currently supported by ARMD programs and projects

Infusing NARI-supported research into ARMD projects

For more information about NARI, visit **nari.arc.nasa.gov/**; for information about ARMD visit **aeronautics.nasa.gov**.

National Aeronautics and Space Administration

**Headquarters**
300 E. Street, SW
Washington, DC 20546

**www.nasa.gov**